

**IN THE CLAIMS:**

Please cancel claims 91-163, without prejudice or disclaimer.

Please ADD the following NEW claims:

164. (NEW) An apparatus comprising:
- a multi-stage optical amplifier including
    - a first amplifier amplifying a wavelength division multiplexed (WDM) optical signal,
    - a dispersion compensator compensating dispersion given to the amplified WDM optical signal and outputting a dispersion compensated WDM optical signal, and
    - a second amplifier amplifying the dispersion compensated WDM optical signal.
165. (NEW) An apparatus as in claim 164, wherein the first and second amplifiers are erbium doped optical fiber amplifiers.
166. (NEW) An apparatus as in claim 164, wherein the dispersion compensator is a dispersion compensation fiber.
167. (NEW) An apparatus as in claim 164, wherein the first and second amplifiers have a combined gain to output the dispersion compensated WDM optical from the second amplifier at a power level sufficient to be received by an apparatus downstream of the second amplifier.
168. (NEW) An apparatus comprising:
- a multi-stage optical amplifier including
    - a first amplifier amplifying a wavelength division multiplexed (WDM) optical signal,

a dispersion compensator providing dispersion compensation to the amplified WDM optical signal, and

a second amplifier amplifying the WDM optical signal provided with dispersion compensation by the dispersion compensator.

169. (NEW) An apparatus as in claim 168, wherein the first and second amplifiers are erbium doped fiber amplifiers.

170. (NEW) An apparatus as in claim 168, wherein the first dispersion compensator is a dispersion compensation fiber.

171. (NEW) An apparatus as in claim 168, wherein the first and second amplifiers have a combined gain so that the WDM optical signal is output from the second amplifier at a power level sufficient to be received by an apparatus downstream of the second amplifier.

172. (NEW) An apparatus comprising:

a multi-stage optical amplifier including

a dispersion compensator providing dispersion compensation to a wavelength division multiplexed (WDM) optical signal,

a first amplifier positioned upstream of the dispersion compensator, and

a second amplifier positioned downstream of the dispersion compensator, wherein a combined gain of the first and second amplifiers is sufficient to compensate a loss in the dispersion compensator and to output the WDM optical signal from the second amplifier with an output power for transmission downstream of the second amplifier.

173. (NEW) An apparatus as in claim 172, wherein the dispersion compensator is a dispersion compensation fiber.
174. (NEW) An apparatus as in claim 172, wherein the first and second amplifiers are erbium doped fiber amplifiers.
175. (NEW) An apparatus comprising:
- a multi-stage optical amplifier including
    - a first amplifier amplifying a plurality of optical signals, each having a different wavelength,
    - a dispersion compensator providing dispersion compensation to the amplified plurality of optical signals, and
    - a second amplifier amplifying the plurality of optical signals provided with dispersion compensation by the dispersion compensator.
176. (NEW) An apparatus as in claim 175, wherein the first and second amplifiers are erbium doped optical fiber amplifiers.
177. (NEW) An apparatus as in claim 175, wherein the dispersion compensator is a dispersion compensation fiber.
178. (NEW) An apparatus comprising:
- a multi-stage optical amplifier including

a dispersion compensator providing dispersion compensation to a plurality of optical signals, each having a different wavelength,  
a first amplifier positioned upstream of the dispersion compensator, and  
a second amplifier positioned downstream of the dispersion compensator, wherein a combined gain of the first and second amplifiers is sufficient to compensate a loss in the dispersion compensator and to output the plurality of optical signals from the second amplifier at output power for transmission downstream of the second amplifier.

179. (NEW) An apparatus as in claim 178, wherein the dispersion compensator is a dispersion compensation fiber.

180. (NEW) An apparatus as in claim 179, wherein the first and second amplifiers are erbium doped fiber amplifiers.

181. (NEW) An optical transmission system comprising:

a multiplexer wavelength-division-multiplexing a plurality of optical signals, each having a different wavelength, into a multiplexed optical signal, and outputting the multiplexed optical signal to an optical fiber;

a multi-stage optical amplifier, optically coupled to the optical fiber, including

a first amplifier amplifying the multiplexed optical signal from the optical fiber,

a dispersion compensator providing dispersion compensation to the amplified multiplexed optical signal to thereby output a dispersion compensated multiplexed optical signal, and

a second amplifier amplifying the dispersion compensated multiplexed optical

signal to thereby output an amplified, dispersion compensated multiplexed optical signal;  
and

a demultiplexer wavelength-division-demultiplexing the amplified, dispersion compensated multiplexed optical signal into respective optical signals.

182. (NEW) An optical transmission system as in claim 181, wherein a combined gain of the first and second amplifiers is sufficient to compensate a loss in the dispersion compensator and to output the amplified, dispersion compensated multiplexed optical signal from the second amplifier at an output power for transmission downstream of the multi-stage optical amplifier.

183. (NEW) An optical transmission system comprising:

an optical transmitter outputting a wavelength division multiplexed (WDM) optical signal to an optical fiber;

a multi-stage optical amplifier, optically coupled to the optical fiber, including

a first amplifier amplifying the WDM optical signal received from the optical fiber,

a dispersion compensator providing dispersion compensation to the amplified WDM optical signal to thereby output a dispersion compensated WDM optical signal, and

a second amplifier amplifying the dispersion compensated WDM optical signal to thereby output an amplified, dispersion compensated WDM optical signal from the multi-stage optical amplifier; and

an optical receiver receiving the amplified, dispersion compensated WDM optical signal output from the multi-stage optical amplifier.

184. (NEW) An optical transmission system as in claim 183, wherein the first and second

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amplifiers have a combined gain so that the amplified, dispersion compensated WDM optical signal is output from the multi-stage optical amplifier at a power level sufficient to be received by the receiver.